WHAT IS CLAIMED IS:

1. A magnetic bearing device, comprising:

a rotor;

position control means for controlling at least one of a radial position and an axial position of the rotor using electromagnets; and

an excitation-drive control circuit for driving, through excitation, the electromagnets and for controlling excitation-drive of the electromagnets,

wherein the excitation-drive control circuit is equipped with:

a first power source that generates a first electric potential;

a second power source that generates a second electric potential lower than the first electric potential;

excitation-drive means which has a choice between the first power source and the second power source and which drives, through excitation, the electromagnets with a current supplied from the power source selected; and

selection control means for selecting, in accordance with a predetermined operation mode, the power source to be chosen at the excitation-drive means.

2. A magnetic bearing device according to claim 1, wherein the selection control means executes cyclic control through PWM control based on a current flowing in the electromagnets.

3. A magnetic bearing device according to claim 1, further comprising:

current/magnetic flux detecting means for detecting a current or magnetic flux of the electromagnets;

computing means for computing a predetermined index value from a change in current or magnetic flux detected by the current/magnetic flux detecting means; and

index value judging means for judging whether or not the index value computed by the computing means is below a reference index value,

wherein the selection control means selects the first power source when the index value judging means judges that the index value is equal to or larger than the reference index value.

4. A magnetic bearing device according to claim 1, further comprising:

RPM detecting means for detecting RPM of the rotor; and

RPM judging means for judging whether or not the RPM detected by the RPM detecting means is within a predetermined range,

wherein the selection control means selects the first power source when the RPM judging means judges that the RPM detected by the RPM detecting means is within the predetermined range.

5. A magnetic bearing device according to claim 1,

wherein the excitation-drive means is equipped with:

a first switch element connected at one end to a positive electrode of the first power source which generates the first electric potential, and connected at the other end to one end of each of the electromagnets;

a first rectifier element connected at a forward outlet end to the other end of the first switch element, and connected at a forward inlet end to a negative electrode;

a second switch element connected at one end to the other end of each of the electromagnets, and connected at the other end to the negative electrode;

a second rectifier element connected at a forward inlet end to the one end of the second switch element, and connected at a forward outlet end to the positive electrode of the first power source;

a third switch element connected at one end to a positive electrode of the second power source which generates the second electric potential;

a third rectifier element connected at a forward inlet end to the other end of the third switch element, and connected at a forward outlet end to the one end of each of the electromagnets;

a fourth switch element connected at one end to the positive electrode of the second power source; and

a fourth rectifier element connected at a forward outlet end to the other end of the fourth switch element, and connected at a forward inlet end to the other end of each of the electromagnets, and

wherein the selection control means connects and cuts off the first switch element, the second switch element, the third switch element, and the fourth switch element.

6. A magnetic bearing device according to claim 1,

wherein the excitation-drive means is equipped with:

a first switch element connected at one end to a first node, and connected at the other end to one end of each of the electromagnets;

a first rectifier element connected at a forward outlet end to the other end of the first switch element, and connected at a forward inlet end to a negative electrode;

a second switch element connected at one end to the other end of each of the electromagnets, and connected at the other end to the negative electrode;

a second rectifier element connected at a forward inlet end to the one end of the second switch element, and connected at a forward outlet end to a second node;

a third switch element connected at one end to a positive electrode of the first power source which generates the first electric potential, and connected at the other end to the first node;

a third rectifier element connected at a forward outlet end to the other end of the third switch element, and connected at a forward inlet end to a positive electrode of the second power source which generates the second electric potential;

a fourth switch element connected at one end to the positive electrode of the second power source, and connected at the other end to the second node; and

a fourth rectifier element connected at a forward inlet end to the other end of the fourth switch element, and connected at a forward outlet end to the positive electrode of the first power source, and

wherein the selection control means connects and cuts off the first switch element, the second switch element, the third switch element, and the fourth switch element.

7. A magnetic bearing device according to claim 2, wherein a pulse width by the PWM control is computed based on Kirchhoff's law in accordance with the electric potential that is generated from the power source selected by the selection control means.

8. A magnetic bearing device according to claim 2, further comprising:

current/magnetic flux detecting means for detecting a current or magnetic flux of the electromagnets;

computing means for computing a predetermined index value from a change in current or magnetic flux detected by the current/magnetic flux detecting means; and

index value judging means for judging whether or not the index value computed by the computing means is below a reference index value,

wherein the index value is a time differential value or increment or negative increment of the current or the magnetic flux of the electromagnets in a predetermined period, or a mean value of the time differential values or a mean value of the increment or the negative increment in a period longer than the predetermined period,

wherein the predetermined period is as long as one cycle of the PWM control,

wherein the period longer than the predetermined period is as long as two or more cycles of the PWM control, and

wherein the selection control means selects the first power source when the index value judging means judges that the index value is equal to or larger than the reference index value.

9. A magnetic bearing device according to claim 3, wherein the index value is a time differential value or increment or negative increment of the current or the magnetic flux of the electromagnets in a predetermined period, or a mean value of the time differential

values or a mean value of the increment or the negative increment in a period longer than the predetermined period.

10. A magnetic bearing device according to claim 4, wherein the predetermined range includes a resonance point that the rotor passes while rotation of the rotor is accelerated.

11. A magnetic bearing device according to claim 5, wherein the current/magnetic flux detecting means is connected in series to at least one element out of the electromagnets, the first switch element, the second switch element, the third switch element, the fourth switch element, the first rectifier element, the second rectifier element, the third rectifier element, and the fourth rectifier element, and is equipped with a current detecting circuit for detecting a current that flows in the element connected.

12. A magnetic bearing device according to claim 5,

wherein the selection control means turns on the first switch element and the second switch element in order to select the first power source and increase a current flowing from one end to the other end of each of the electromagnets,

wherein the selection control means turns off the first switch element, the second switch element, the third switch element, and the fourth switch element in order to select the first power source

and reduce a current flowing from one end to the other end of each of the electromagnets,

wherein the selection control means turns on the second switch element and turns off the first switch element and the third switch element, or turns on the first switch element and turns off the second switch element and the fourth switch element, in order to select the first power source and keep a current flowing from one end to the other end of each of the electromagnets constant,

wherein the selection control means turns on the second switch element and the third switch element and turns off the first switch element in order to select the second power source and increase a current flowing from one end to the other end of each of the electromagnets,

wherein the selection control means turns on the fourth switch element and turns off the first switch element, the second switch element, and the third switch element in order to select the second power source and reduce a current flowing from one end to the other end of each of the electromagnets, and

wherein the selection control means turns on the second switch element and turns off the first switch element and the third switch element, or turns on the third switch element and the fourth switch element and turns off the first switch element and the second switch element in order to select the second power source and keep a current flowing from one end to the other end of each of the electromagnets

constant.

13. A magnetic bearing device according to claim 5,

wherein the first switch element, the second switch element, the third switch element, and the fourth switch element are power MOSFETs, and

wherein the first rectifier element, the second rectifier element, the third rectifier element, and the fourth rectifier element are diodes.

14. A magnetic bearing device according to claim 6, wherein the current/magnetic flux detecting means is connected in series to at least one element out of the electromagnets, the first switch element, the second switch element, the third switch element, the fourth switch element, the first rectifier element, the second rectifier element, the third rectifier element, and the fourth rectifier element, and is equipped with a current detecting circuit for detecting a current that flows in the element connected.

15. A magnetic bearing device according to claim 6,

wherein the selection control means turns on the first switch element, the second switch element and the third switch element in order to select the first power source and increase a current flowing from one end to the other end of each of the electromagnets,

wherein the selection control means turns off the first switch element, the second switch element, and the fourth switch element in order to select the first power source and reduce a current flowing from one end to the other end of each of the electromagnets,

wherein the selection control means turns on the second switch element and turns off the first switch element, or turns on the first switch element and the third switch element and turns off the second switch element and the fourth switch element, in order to select the first power source and keep a current flowing from one end to the other end of each of the electromagnets constant,

wherein the selection control means turns on the first switch element and the second switch element and turns off the third switch element in order to select the second power source and increase a current flowing from one end to the other end of each of the electromagnets,

wherein the selection control means turns on the fourth switch element and turns off the first switch element and the second switch element in order to select the second power source and reduce a current flowing from one end to the other end of each of the electromagnets, and

wherein the selection control means turns on the second switch element and turns off the first switch element, or turns on the first switch element and the fourth switch element and turns off the second switch element and the third switch element in order

to select the second power source and keep a current flowing from one end to the other end of each of the electromagnets constant.

16. A magnetic bearing device according to claim 6,

wherein the first switch element, the second switch element, the third switch element, and the fourth switch element are power MOSFETs, and

wherein the first rectifier element, the second rectifier element, the third rectifier element, and the fourth rectifier element are diodes.

17. A magnetic bearing device according to claim 6,

wherein the plural electromagnets are arranged,

wherein the excitation-drive control circuit controls the plural electromagnets individually, and

wherein the plural electromagnets share at least one of the first node and the second node in the excitation-drive control circuit.

18. A magnetic bearing device according to claim 17, wherein the third switch element, the third rectifier element, the fourth switch element, and the fourth rectifier element for the plural electromagnets are each composed of one element.

19. A magnetic bearing device, comprising:

a rotor;

position control means for controlling at least one of a radial position and an axial position of the rotor using electromagnets; and

an excitation-drive control circuit for driving, through excitation, the electromagnets and for controlling excitation-drive of the electromagnets,

wherein the excitation-drive control circuit is equipped with:

N power sources that generate two or more electric potentials;

excitation-drive means which can select one of the N power sources and which drives, through excitation, the electromagnets with a current supplied from the power source selected; and

selection control means for selecting, in accordance with a predetermined operation mode, the power source to be selected at the excitation-drive means.

20. A pump device comprising the magnetic bearing device according to claim 1, wherein the pump device is connected to subject equipment to suck a predetermined gas out of the subject equipment.

21. A pump device according to claim 20, further comprising:

a rotor having rotor blades and a rotor shaft that is placed at the center of the rotor blades; and

a motor for rotating the rotor.

22. A pump device according to claim 20, further comprising task judging means for judging whether or not a task carried out in the subject equipment is a predetermined task,

wherein the selection control means selects the second power source when the task judging means judges that a task carried out in the subject equipment is the predetermined task.

23. A pump device according to claim 22, wherein the predetermined task is irradiation of an ultraviolet ray on a semiconductor wafer or irradiation of an electron beam from an electron microscope in the subject equipment.

24. A pump device comprising the magnetic bearing device according to claim 19, wherein the pump device is connected to subject equipment to suck a predetermined gas out of the subject equipment.

25. A pump device according to claim 24, further comprising:

a rotor having rotor blades and a rotor shaft that is placed at the center of the rotor blades; and

a motor for rotating the rotor.

26. A pump device according to claim 24, further comprising

task judging means for judging whether or not a task carried out in the subject equipment is a predetermined task,

wherein the selection control means selects the second power source when the task judging means judges that a task carried out in the subject equipment is the predetermined task.

27. A pump device according to claim 26, wherein the predetermined task is irradiation of an ultraviolet ray on a semiconductor wafer or irradiation of an electron beam from an electron microscope in the subject equipment.